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Reregulation and the Regulatory Timeline

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Reregulation and the Regulatory Timeline

Peter Molk* & Arden Rowell**

ABSTRACT: Regulation is often casually conceived of as functioning like a binary on/off switch: as if an area, issue, or industry is either regulated or not. While this binary model of regulation can be useful, it also decontextualizes regulatory decisions from their position in time, and thus obscures important ways by which regulators are constrained and incentivized by past and future decisions. As an alternative, we present a timeline approach to regulation. The timeline approach is particularly helpful in illustrating the ways that earlier regulatory decisions create vestigial effects for later related decisions, and for highlighting the informational advantage that later regulators have over regulators earlier in the timeline. These temporally contextualized qualities are especially important under conditions of reregulation, which arise when a previously deregulated issue is regulated once again. Applying insights from financial option theory, we show how lessons from the timeline approach can be used to enhance regulatory decision-making at all stages on the timeline.

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I. INTRODUCTION.....	1498
II. THE REGULATORY TIMELINE	1501
A. <i>THE REGULATORY TIMELINE</i>	1502
1. Temporal Scope	1502
2. Intertemporal Dependence.....	1504
B. <i>REREGULATION AS A CATEGORY</i>	1510
1. Vestigial Effects.....	1510
2. Opportunities for Learning.....	1511
3. Distinctiveness of Reregulation.....	1512
III. USES FOR REGULATORY TIMELINES	1513
A. <i>USING TEMPORAL SCOPE</i>	1513
B. <i>USING INTERTEMPORAL DEPENDENCE</i>	1515
IV. PRESCRIPTIONS FOR TIMELINES	1520
A. <i>INSIGHTS FROM OPTION THEORY</i>	1522
B. <i>INCORPORATING FLEXIBILITY INTO DECISION-MAKING</i>	1525
1. Follow Simple Rules of Thumb.....	1525
2. Perform Qualitative Ordinal Analysis.....	1526
3. Use Full Decision Trees	1527
4. Price the Regulatory Option	1529
C. <i>FORGOING CERTAINTY</i>	1530
D. <i>SUMMARY</i>	1531
V. CONCLUSION	1531

I. INTRODUCTION

In the modern regulatory state, regulations—agency-made law—are in a constant state of flux. Regulators¹ regulate new industries; those regulations are later unwound through deregulation; and changing circumstances then drive a need for renewed regulatory approaches. The result is a complex and trembling web of regulatory influence that is constantly being woven, unwoven, and rewoven.

Experts sometimes describe these shifting regulatory landscapes as following a “cycle” or “sine wave,” swinging like a “pendulum,” or “oscillating,”

1. Throughout this Article we use “regulator” to mean an implementer of regulatory policy. Thus, regulators include actors engaged in what we call initial regulation (the first meaningful regulation of an area, issue, or industry), regulatory reform (substantive changes to existing regulation), deregulation (the rolling back of an existing regulatory policy), and reregulation (regulating a previously deregulated industry). The exact boundaries of each of these tasks is likely to be fluid, but we will argue that regulators at various stages of a timeline nevertheless tend to face different challenges and opportunities when engaging in regulatory action.

as an industry is first regulated and later deregulated or subjected to regulatory change.² These metaphors all imply a binary regulatory process, with regulation functioning essentially like a flip switch: either “on” (regulation) or “off” (deregulation). Under this mentality, the decision to regulate after a period of deregulation—what we refer to as *reregulation*³—looks just like the decision to regulate an industry initially: in both cases, regulation is merely “switched on.” From this perspective, the intervening deregulation serves to roll back the clock, as if the initial regulation had never happened.

Binary models of regulation capture much that is important about how regulation functions. They are particularly helpful for emphasizing distinctions between the two prongs of the “regulated” and “not regulated” dichotomy, and for highlighting similarities within periods of regulation and of non-regulation. They can also be useful for emphasizing the type of political oscillation that is most likely to occur under a two-party political system, and how such oscillation is likely to press upon administrative agencies.⁴

2. See, e.g., Walter R. Burkley, *Environmental Reform in an Era of Political Discontent*, 49 VAND. L. REV. 677, 678 n.4 (1996) (referring to the “oscillations in environmental regulation”); John C. Coffee, Jr., *The Political Economy of Dodd-Frank: Why Financial Reform Tends to Be Frustrated and Systemic Risk Perpetuated*, 97 CORNELL L. REV. 1019, 1029 (2012) (defining the phrase “Regulatory Sine Curve” as characterizing regulation in, among other industries, finance and environmental regulation); Richard D. Cudahy, *Retail Wheeling: Is This Revolution Necessary?*, 25 ENERGY L.J. 161, 163 n.16 (2004) (referring to the “pendulum-like oscillation . . . between regulation and competition”); Patrick McGinley, *Collateral Damage: Turning a Blind Eye to Environmental and Social Injustice in the Coalfields*, 19 J. ENVTL. & SUSTAINABILITY L. 304, 385 n.265 (2013) (referring to the “repeating cycle” of environmental safety regulation); Anne Joseph O’Connell, *Political Cycles of Rulemaking: An Empirical Portrait of the Modern Administrative State*, 94 VA. L. REV. 889 (2008) (tracking the “cycles” of rulemaking by following political transitions); Larry E. Ribstein, Commentary, *Bubble Laws*, 40 HOUS. L. REV. 77, 79–83 (2003) (developing a “cycle” of financial regulation). On occasion both the regulatory framework and the accompanying industry response are described this way. See, e.g., Frank Partnoy, *Shapeshifting Corporations*, 76 U. CHI. L. REV. 261, 284–85 (2009) (analyzing the cycling of corporations between public and private ownership due to changing regulatory environments).

3. Although “reregulation” is a term occasionally used in the literature, in the past, it has lacked any generally accepted definition. See, e.g., Nicole Fradette et al., *Project: Regulatory Reform: A Survey of the Impact of Reregulation and Deregulation on Selected Industries and Sectors*, 47 ADMIN. L. REV. 461 (1995) (writing a 200-page study that never defines or expands on the term); Barry R. Weingast, *Regulation, Reregulation, and Deregulation: The Political Foundations of Agency Clientele Relationships*, 44 LAW & CONTEMP. PROBS. 147 (1981) (failing to define or expand on the term); see also ALAN GART, REGULATION, DEREGULATION, REREGULATION: THE FUTURE OF THE BANKING, INSURANCE, AND SECURITIES INDUSTRIES (1994) (using “reregulation” variously to encompass our view of reregulation and as what we call regulatory reform). But see Jeff Schwartz, *The Twilight of Equity Liquidity*, 34 CARDOZO L. REV. 531, 600–02 (2012) (using “reregulation” to refer to the period of regulation following deregulation, as the term is used in this Article).

4. See, e.g., O’Connell, *supra* note 2 (tracking the “cycles” of administrative regulation as they are affected by political oscillation between two parties).

Yet we worry that the binary narrative might also obfuscate a key aspect of regulatory decision-making: its temporal context. Any regulatory decision entwines with prior and future regulatory decisions: the impacts of a single current regulation are determined, in part, by past policy decisions; and will determine, in part, the costs and benefits of future policy decisions. When regulatory policy is treated categorically, it can obscure the fact that the same policy may have very different impacts—both on the area being regulated and on future regulators working in the same area—depending upon the time and conditions under which it is implemented.

To illustrate the importance of temporal context to regulatory policy, we present a *timeline approach* to regulatory decision-making as a complementary alternative to the more familiar *binary approach*. The timeline approach analyzes regulatory decisions along a timeline, and thus helps capture the ways in which regulatory decisions differ depending upon their temporal context. The import of temporal contextualization is particularly clear for reregulatory decisions: for such decisions, we will argue that the timeline approach helps reveal how the decision to reregulate can be very different from the decision to enact initial regulation, even when the policies themselves look similar on their face.

In our view, the timeline approach highlights two distinctive aspects of reregulatory decisions that can otherwise be obscured by the binary approach. First, earlier decisions on a timeline can fundamentally change the underlying behaviors and industries being regulated, introducing *vestigial effects* that alter the position of the reregulator from that of the initial regulator. In other words, policies themselves can create impacts that change the landscapes of costs and benefits faced by future regulators. Because of this, the reregulator may face neither the same challenges nor the same suite of feasibly implementable policies as the initial regulator.

Second, experiences with regulation and deregulation provide the reregulator with opportunities for learning how regulatory policy affects the underlying behaviors or industry. This means that even where the underlying behavior or industry does not change, the reregulator's knowledge of what is being regulated—and how it responds to regulation—may have developed beyond what would have been possible for the initial regulator. This also creates differences between reregulators and policymakers situated earlier on a regulatory timeline.

We believe that the chief prescriptive implication of the timeline approach is that it demonstrates that regulators have the opportunity to shape the future of regulatory policy by adopting current policies that affect future policies' cost-benefit landscape. This is true regardless of where on a timeline the regulatory decision occurs—for initial regulation, deregulation, reregulation, and intervening or subsequent regulatory reform. Current policies might reduce future costs of policy change, as by implementing structured data-gathering or information-generating mechanisms into

existing policies, thereby reducing the cost of future information. Or they might increase future costs, as by implementing strategies with significant vestigial effects that make it more difficult for future regulators to adopt alternative strategies for regulating the affected market. Either way, the timeline approach helps illustrate that regulatory decisions have impacts on—and are impacted by—not just the market or target they seek to regulate, but also for and by related regulatory decisions through time.

We use Part II of this Article to further outline the concept of a regulatory timeline. We describe the operation of a regulatory timeline, explain how it fits within current methods of regulatory decision-making, and identify the ways in which initial regulation, deregulation, and reregulation can and do interact with one another. Because we believe that the stage of reregulation exemplifies the distinction between a binary and a timeline approach, we then develop the category of reregulation further. We emphasize two ways in which reregulatory decisions differ from prior regulatory decisions along the same timeline: because they must account for the vestigial effects of past regimes, and because they are informed by the opportunity to learn from past regimes.

Part III argues that the timeline approach to regulation helps reveal ways regulators can strategically (or even accidentally) obstruct or facilitate regulatory change, in turn entrenching or making vulnerable their policy of choice. The ability to impose vestigial effects and learning opportunities on the future can affect future cost-benefit analyses, influencing the policies that future regulators ultimately adopt.

In Part IV, we develop two prescriptions for how regulators might manage the regulatory challenges and opportunities that are highlighted by the timeline approach. The first (modest) prescription is that regulators might be further encouraged to adopt transparent mechanisms for setting temporal scope when performing Regulatory Impact Analyses. Although transparency in scoping is already encouraged by executive guidance, understanding more of the implications of that transparency should provide a refreshed and heightened call for enforcing the recommendations already in place. The second set of prescriptions presents a range of possible approaches to systemizing analysis of the intertemporal dependence among regulatory decisions at different points on a timeline. The easiest, cheapest, and least formal of these approaches would simply involve a qualitative discussion of intertemporal decision-making impacts; the most formal would provide a platform for integrating insights from financial option pricing theory into current regulatory analysis.

II. THE REGULATORY TIMELINE

This Part presents the concept of the regulatory timeline as a tool for portraying the progression of regulatory actions through time. It argues that a timeline approach, in contrast or complement to a binary approach, offers two valuable benefits: it allows regulators to identify and evaluate the very real

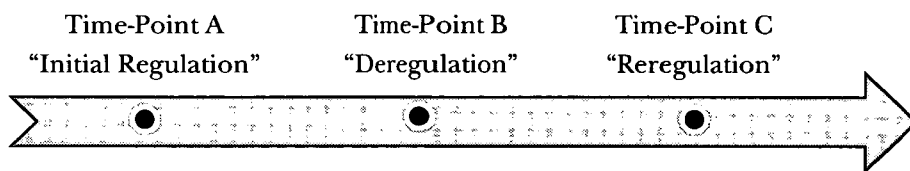
interdependent relationships among past, present, and future regulatory decisions, and it can be used to discipline the temporal scope with which a regulatory decision is concerned. We then address the position of reregulation as a phase in the regulatory timeline, and apply timeline-based analysis to identify two characteristics of reregulation that arise from its position on the regulatory timeline that distinguish it from prior decisions along the same timeline: (1) vestigial effects from prior regulatory phases; and (2) opportunities for learning from the application of multiple regulatory policies to the same underlying condition(s).

A. THE REGULATORY TIMELINE

The timeline approach to regulatory decision-making holds that regulatory decisions should be understood as being temporally situated: as occurring at a particular point in time, which happens before some events and after others.

A timeline can, of course, be represented in many different ways, but even a very simple form can help illustrate the features of the approach. For the remainder of the discussion in this Subpart, then, consider this timeline:

Figure 1. A Simple Regulatory Timeline



Timelines can assist regulators and analysts by illustrating two important characteristics common to regulatory decision-making contexts: temporal scope and intertemporal dependence. We begin below by discussing temporal scope, or the notion that the length of time with which regulators concern themselves informs the substance of regulatory decision-making. We then discuss the more complex notion of intertemporal dependence, or the idea that different stages of regulatory policy should properly be construed as related to and dependent upon one another, rather than viewed as a series of isolated, independent events.

1. Temporal Scope

With what length of time—both in the future and in the past—should regulators be concerned? The answer to this question determines the temporal scope of a regulatory analysis: the distance that the line segment is considered to extend both before and after the time-point of the decision.

One important feature of the timeline approach is that it helps foreground the strategic selection of scope.

Consider, for example, the Environmental Protection Agency's decision about whether to site U.S. hazardous waste disposal at Yucca Mountain in Nevada. EPA chose to base its analyses on an endpoint 10,000 years in the future, despite recommendations from the National Academy of Science to use a 1,000,000 year prospective temporal scope;⁵ the difference between the two scopes would determine how hazardous nuclear waste could be stored at Yucca Mountain.⁶ The D.C. Circuit overturned the EPA's decision on review for failing to explain adequately their decision to use 10,000 years as the relevant temporal scope,⁷ and the EPA consequently adopted a 1,000,000 year temporal scope for future decision-making regarding hazardous nuclear waste disposal.⁸

The prospective temporal scope is not the only paradigm that matters, however; regulators' retrospective scope can also alter the regulatory actions they take. As we will shortly discuss, intertemporal dependence implies that earlier events can constrain or facilitate regulatory action at a later time. Thus, the circumstances regulators currently face are often due to a complex causal chain of prior events. The longer the retrospective temporal scope that regulators adopt for these prior events, the more comprehensive picture they will develop for the causal chain.

For instance, a myopic view of the current financial crisis might attribute it solely to the precipitating economic downturn, so that the regulatory fix would be to address the current downturn. Lengthening the retrospective temporal scope, a regulator might also attribute the crisis to banks' willingness to issue subprime mortgage loans, and try to fix that as well. Looking further back, the deregulator might also think that the demand for these risky loans was influenced by the conversion of investment houses like Goldman Sachs to limited liability corporate forms, which incentivized them to undertake more risk,⁹ so the regulator might try to address this as well. Or a regulator with an even longer retrospective temporal scope might also decide that repeal of the Depression-era Glass–Steagall banking reform was the key precipitating cause, and advocate for its reimplementation.¹⁰ The point here is that temporal

5. See Arden Rowell, *Time in Cost–Benefit Analysis*, 4 U.C. IRVINE L. REV. 1215, 1233 n.86 (2014) (discussing the implications of the scope determination for Yucca Mountain).

6. See COMM. ON TECH. BASES FOR YUCCA MOUNTAIN STANDARDS ET AL., TECHNICAL BASES FOR YUCCA MOUNTAIN STANDARDS (1995); see also *Nuclear Energy Inst., Inc. v. Envtl. Prot. Agency*, 373 F.3d 1251, 1266–73 (D.C. Cir. 2004).

7. *Nuclear Energy Inst., Inc.*, 373 F.3d at 1266–73.

8. 40 C.F.R. § 197.12 (2015).

9. See Avik Roy, *Want to Improve Goldman Sachs? Convert It Back into a Partnership*, FORBES (Mar. 14, 2012, 11:51 AM), <http://www.forbes.com/sites/aroy/2012/03/14/want-to-improve-goldman-sachs-convert-it-back-into-a-partnership>.

10. See *infra* Part II.B.

scope matters not just for estimating an action's impact on the future, but also for identifying the cause or causes of the phenomenon the regulation is designed to address.¹¹

It is not uncommon for regulators to be relatively haphazard when selecting regulatory scope. EPA's largely unexplained choice of temporal scope for Yucca Mountain was not unique: regulators across agencies often fail to explain their chosen scope of time, and often the scope they do use is buried deep in the technical modeling within Regulatory Impact Analyses.¹² A timeline approach can help agencies facing this sort of decision to be disciplined in their approach to the question of temporal scope, while assisting judges, analysts, regulators, and academics in rigorous review of temporal scope decisions.

Why should regulators limit the temporal scope at all, rather than incorporating all information from the beginning of time and considering the possible consequences until the end of time? By identifying some limits to temporal scope, the regulator makes analyses more tractable and can avoid computational messes.¹³ Yet as the scope becomes more restricted, regulators risk adopting inefficient policies that impose costs on later periods outside the relevant period.¹⁴ The appropriate temporal scope, therefore, can be a key input into the regulatory process, and the timeline approach can help illuminate the stakes of scope selection.¹⁵

2. Intertemporal Dependence

A timeline approach that represents multiple regulatory decisions along a single temporal axis can also be a helpful tool for aiding systematic interrogation of the relationships among different points on the line. In our view, different stages of regulatory policy should properly be construed as

11. See generally PAUL PIERSON, *POLITICS IN TIME: HISTORY, INSTITUTIONS, AND SOCIAL ANALYSIS* (2004) (arguing that a long retrospective temporal scope is desirable because it reveals the underlying phenomena a regulation is meant to address).

12. See Rowell, *supra* note 5, at 1233-37.

13. Among other decision costs, estimating impacts until the end of time would involve considerable uncertainty in more distant years, and discounting the costs and benefits in these distant years to present value would also render many of these distant effects negligible. But see generally Tyler Cowen, *Caring About the Distant Future: Why It Matters and What It Means*, 74 U. CHI. L. REV. 5 (2007) (advocating for incorporating distant costs and benefits into regulatory decisions); Douglas A. Kysar, *Discounting . . . on Stilts*, 74 U. CHI. L. REV. 119 (2007) (same).

14. For instance, because the Congressional Budget Office restricts its cost estimates to a ten-year projection, some commentators have questioned the Affordable Care Act's long-term viability, even though it was budget neutral as scored by the CBO. See, e.g., *ObamaCare's Real Price Tag: The Funding Gap Is a Canyon by Year 10*, WALL STREET J. (Aug. 6, 2009, 8:46 AM), <http://www.wsj.com/articles/SB10001424052970203609204574314622075560890>.

15. For perspectives on how to select a scope, see Eric A. Posner, *Agencies Should Ignore Distant-Future Generations*, 74 U. CHI. L. REV. 139, 139-40 (2007); Rowell, *supra* note 5, at 1238-39 (arguing that agencies should at least extend their temporal scopes to the temporal break-even point).

related to and dependent upon one another, rather than viewed as a series of isolated, independent events. We refer to this phenomenon as the “intertemporal dependence” of regulatory decision-making.

The basic intuition underlying intertemporal dependence is that what comes before—and is expected to come after—a regulatory decision may have fundamental implications for how that regulatory decision is structured. Earlier policies can either inhibit or facilitate future regulatory policies, by implementing regulatory roadblocks or making regime changes easier. A regulatory policy that requires significant industry-specific investments by participants, for example, makes it costly to implement regulatory change that forces incumbents to abandon their projects.¹⁶

A numerical example may illustrate how regulatory decisions at different points on a timeline display intertemporal dependence. Imagine that a regulator at “Time-Point A” implements a policy that requires the regulated industry to adopt and operate a particular piece of technology, such as a pollution monitor on a smokestack. Suppose the cost of the monitoring technology will be 9 (this could be \$9 million, or \$90 million, or \$900 million, but we will keep the numbers small to simplify). The decision by an initial regulator to require the costly technology would thus be cost-justified only if the social benefits of the monitoring were at least 9 as well. Assume that the benefits of the technology are expected to be 10 over the next decade. In that case, the initial requirement for the technology would be cost-justified. Imagine that the initial regulator thus adopts the policy.

Table 1. Example of the Temporally Interdependent Costs and Benefits of a Smokestack Monitoring Policy at Three Different Time-Points

	Time-Point A “Initial Regulation”	Time-Point B “Deregulation”	Time-Point C “Reregulation”
Costs	9	2	4
Benefits	10	1	6
Net Benefits	+1	-1	+2
Is the Policy Cost-Justified?	Yes	No	Yes

Assume that ten years pass, such that the regulator is now at “Time-Point B.” The regulator at Time-Point B faces a different context for decision-making than did the regulator at Time-Point A. The pollution monitor is still attached to the smokestack, left over from the prior requirement. Industry practice and norms may have developed with increased monitoring, and communities around regulated industries may have grown up in part based on existing industry emissions. The regulator at Time-Point B might conclude, based on then-current emissions rates and monitoring norms, that

16. See, e.g., *infra* Part II.B.1 (discussing vestigial effects).

the benefits of continuing to require the monitoring technology are significantly reduced—perhaps only 1 over the next decade. At the same time, the costs of continuing to require the technology are reduced by the fact that the industry has already invested in smokestack monitors. Costs are thus no longer expected to be 9—the estimate incorporating the initial cost of purchasing technology—but 2, a figure that might represent continued maintenance and upkeep costs, as well as the now-reduced cost for a technology that has had increased demand over the prior decade. Under these circumstances, where expected cost is 2 and expected benefits are 1, the regulator might choose to deregulate, eliminating the requirement for the smokestack monitors.

Assume that five more years pass. It is now “Time-Point C.” The regulator at Time-Point C faces a different context for decision-making than either prior regulator. A key factor to note here is that—even without intervening scientific or technological development—the regulator at Time-Point C has significantly more information about emissions behaviors than either prior regulator, because regulator C knows how industry, communities, and the public behave when a monitor is required and when it is not. No prior regulator had that information.

With this in mind, it is possible to evaluate the impacts of policies at Time-Points A and B on the expected costs and benefits of readopting a smokestack monitoring rule at Time-Point C.

Begin with costs. The cost of smokestack monitors is likely to be less than it was at Time-Point A, not only because of general technological development, but also because of the direct impacts that policy had on the availability of parts (in this case, leftover smokestack monitors—some of which may still even be attached to the smokestacks) and on the market price for monitoring technologies (by increasing demand for that technology over the previous ten-year period). Yet costs may be higher than at Time-Point B, because of the direct impact that the deregulation had on parts availability, trained personnel availability, and in reducing the total demand for monitors in the intervening years. As a result, imagine the cost of adopting a smokestack-monitoring requirement is now 4.

Now consider the impact of prior policies on the expected benefits of readopting the policy. The deregulator at Time-Point B calculated expected benefits based upon then-current emissions rates and monitoring norms. But those estimates of industry behavior were mere projections: the reregulator at Time-Point C now actually knows how industry behavior developed in response to deregulation and to other background changing circumstances. Given the complex interplay of regulatory requirements and industry norms, the norms may well have shifted and relaxed during deregulation. At the same time, exogenous factors like rising real estate prices and population growth may have pushed additional residential settlement nearer to the sources of the emissions. In addition, scientific progress may now illuminate the benefits

calculation in ways that were unavailable to prior regulators: research might now show, for example, that smokestack emissions impact human and environmental health more than previously thought. As a result, the benefits of the policy at Time-Point C could well be something like 6. As a result, the same policy is now cost-justified once more.

This example helps illustrate three observational points. First, the landscape of costs and benefits faced by regulators at different points on the timeline were significantly affected by the decisions of regulators earlier on the timeline. The deregulator at Time-Point B, for example, faced the costs and benefits it did because of the decision at Time-Point A to regulate. Without that decision, the regulatory landscape at Time-Point B might well have been completely different. Ignoring the temporal context of the decision at Time-Point B thus obscures what could be a critical aspect of the decision-making.

Second, and conversely, the regulators at each point on the timeline significantly affected subsequent regulators. The reregulator at Time-Point C was affected by both the decision to initially regulate and the decision to deregulate: without both decisions, the regulator at Time-Point C might also have faced importantly different costs and benefits. Here again, ignoring the temporal context of the decision at Time-Point C could lead an analyst to overlook important and even determinative aspects of regulatory decision-making.

Third, and finally, the example shows how the reregulator at Time-Point C is faced with a meaningfully different decision from the initial regulator at Time-Point A. A binary approach to the smokestack monitoring policy context would treat the policy decision at Time-Point A and Time-Point C as if they were the same: as if they both represented the regulatory status of switching regulation “on.” Yet while regulators at the different time-points would indeed be considering the same policy—in this case, whether to require smokestack monitors for this particular industry—they face very different landscapes of costs and benefits associated with that policy. For regulatory analyses that seek to understand how and why regulators do and should make decisions, obscuring these differences is problematic.

Those are descriptive takeaways of the smokestack monitor example. But the example—and its situation within a timeline approach—also helps generate prescriptions for regulators.

First, illustrating the changing costs and benefits over time can explain how regulatory change—even what appears to be regulatory “oscillation”—may actually be optimal (and thus socially desirable) under some circumstances. This point stands in contrast to a common assumption, bolstered by the lack of temporal context in the binary approach, that

switching back and forth between the status of “regulated” and “not regulated” is wasteful, inefficient, or politically suspect.¹⁷

A second and more complex prescription is that the selection of current policies should be informed by the knowledge that future industry changes will be affected by current decisions.¹⁸ Regulators routinely account for the expected impacts of regulation on industry and the public when they perform Regulatory Impact Analyses.¹⁹ If the decisions of a regulator at any point on a timeline will also affect subsequent regulators—and thus the industry and members of the public affected by the regulation—then impacts on future regulators may sometimes be as relevant to sound policy decisions as immediate, direct impacts on industry and the public. Similarly, retrospective analyses should strive to account for the impacts of past regulatory decisions on the present landscape of policymaking costs and benefits.

This point builds on the phenomenon of path dependence as it has been explored in social science literatures. Path dependence focuses on explaining ways in which the set of decisions one faces at a particular point in time is limited by past decisions. In the words of one prominent researcher, it is the idea that “‘history matters’ or that ‘the past influences the future.’”²⁰ Path dependence has been broadly applied to a variety of phenomena, including why institutions and industries evolve as they do,²¹ why inferior technologies

17. See Brett McDonnell, *Dampening Financial Regulatory Cycles*, 65 FLA. L. REV. 1597, 1631–39 (2013) (exploring ways to “dampen” regulatory change while still recognizing that change can be desirable); see also *supra* note 2 (citing sources implicitly using the binary approach). But see Roberta Romano, *The Sarbanes–Oxley Act and the Making of Quack Corporate Governance*, 114 YALE L.J. 1521, 1595 (2005) (arguing for mandatory rollbacks of legislation passed in response to crises).

18. For a thoughtful argument that regulators should generally seek to regulate by envisioning the future direction of change over time, see generally DAVID M. DRIESEN, *THE ECONOMIC DYNAMICS OF LAW* (2012). While we agree with Driesen that regulatory analysts face significant opportunities to more thoroughly account for expected future changes, here we emphasize the impact of the regulator’s decision itself as a vector for future changes.

19. See OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, *REGULATORY IMPACT ANALYSIS: A PRIMER* 9 (2011), https://www.whitehouse.gov/sites/default/files/omb/inforeg/regpol/circular-a-4_regulatory-impact-analysis-a-primer.pdf (“[Agencies] should, to the extent feasible, estimate the monetary value of the benefits and costs of each regulatory alternative considered. Both benefits and costs are measured by the value that individuals place on the change resulting from a particular regulatory alternative.”).

20. James Mahoney, *Path Dependence in Historical Sociology*, 29 THEORY & SOC’Y 507, 507 (2000) (invoking these common conceptions to motivate formalizing the concept of path dependence). See generally Tom Ginsburg et al., *Libertarian Paternalism, Path Dependence, and Temporary Law*, 81 U. CHI. L. REV. 291 (2014) (attempting to combat path dependence with law).

21. E.g., HENRY HANSMANN, *THE OWNERSHIP OF ENTERPRISE* 241, 262–63, 284–85 (1996) (explaining the industrial organization of certain industries in part by invoking historical happenstance); DOUGLASS C. NORTH, *INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE* 92–104 (1990) (emphasizing path dependence’s role in shaping the choice of various institutions).

are adopted over superior ones,²² and why social conventions emerge and persist.²³ These explanations often invoke the economic idea of evolutionary stable equilibria: in a situation where several possible end-games exist, decisions early in a timeline can irrevocably lead one down a course towards one single equilibrium, while the costs of reversing that course increase the further one progresses down such a course.²⁴

Path dependence is closely related to the causal link stretching from the past into the present.²⁵ For instance, path dependence has been used to explain the continued dominance of QWERTY keyboards.²⁶ Once society has converged on a particular layout, switching to a new one involves incurring expenses: typists must learn a new layout, manufacturers must retool their operations, etc. As long as these switching costs exceed the incremental gains from moving to a new layout, society will remain stuck in the existing configuration. Thus, the QWERTY keyboard, as the first to gain traction, steered society down a course to its present state of almost exclusive QWERTY usage, despite the existence of arguably superior alternatives.²⁷

The application of path dependence literature into prospective regulatory decision-making is complicated by the strategic aspect of public policy decisions. Because path dependency is invoked to explain how a current state of affairs was reached, it is primarily backward looking, and relies on precipitating exogenous happenstance to get started down a particular path. Regulatory decision-making, however, involves recognizing not just the historical events that helped determine the state of affairs regulators currently face—the typical application of path dependence—but also recognizing the impacts that current actions will have on future regulators. This then feeds back strategically into informing the action regulators will take today. This latter attribute extends path dependence by recognizing that regulators' intentional choices—in addition to the historical happenstance that facilitated those intentional choices—will interact to impact which future path regulators choose.

Because regulatory decision-making allows for consideration of multiple kinds of relationships among the future, present, and past, we think these intertemporal relationships are better understood as exhibiting

22. See, e.g., Paul A. David, *Clio and the Economics of QWERTY*, 75 AM. ECON. REV. 332, 332–33 (1985).

23. See generally Robert Sugden, *Spontaneous Order*, 3 J. ECON. PERSP. 85 (1989) (discussing several such examples).

24. See, e.g., *id.* at 90–92.

25. Mahoney, *supra* note 20, at 510.

26. See generally David, *supra* note 22. David argues that the continued dominance of the QWERTY configuration creates a cost for anyone wishing to switch to other configurations. The existing standard therefore sustains itself as a function of the limits, or costs, imposed by past decisions to adopt the first-to-market QWERTY keyboard. *Id.* at 335–36.

27. *Id.*

intertemporal dependence, rather than the more limited and unidirectional path-dependence (or, for that matter, the temporally decontextualizing model of a binary switch). A timeline is a helpful tool for visualizing and systematizing considerations of intertemporal dependence, because it portrays these multiple decision points along a single axis.

B. REREGULATION AS A CATEGORY

Because it showcases the temporal context of regulatory decisions, the timeline approach can be helpful at any stage in a regulatory process. In this Subpart, however, we want to focus on a particular stage of regulatory decision-making—reregulation—as emblematic of the theoretical divergence between the timeline approach and the binary approach.

Reregulation occurs when a previously deregulated area is regulated once more. Under a traditional binary model, reregulation looks identical to initial regulation: both are instances of regulation being “on” rather than “off.” Once a reregulatory decision is situated along a timeline, however, its intertemporal dependence on related regulatory decisions becomes more apparent. In particular, we argue here that the timeline approach reveals two characteristics of reregulation that arise predictably in reregulatory contexts, and which are obscured under the traditional binary approach. These characteristics are: the existence of vestigial effects left over from prior regulatory regimes, and opportunities for learning from prior regimes.

1. Vestigial Effects

Reregulation does not occur on a blank slate. It arises only where there have been prior regulatory regimes—regimes that can leave traces behind. These might include agency-specific effects—such as inherited decision procedures, internal organizational forms and staffing, leftover agencies, or data collection or review—and industry-specific effects, as where industry players or the market changed structure in response to prior regulatory regimes. Vestiges remaining from earlier points along the regulatory timeline affect the feasible set of policies that can be implemented at reregulation. In particular, they can affect the costs and benefits associated with choosing one policy over another. These are the impacts commonly described in path dependence literature.

Consider the establishment of internal agency decision-making hierarchies. Within an agency, particularized decision-making hierarchies may have been established to serve earlier decision-making processes.²⁸ Agency decision-making processes themselves may have been developed to

28. For a very helpful cataloging of the many ways that internal agency structure can affect agency decision-making, see generally Jennifer Nou, *Intra-Agency Coordination*, 129 HARV. L. REV. 421 (2015).

serve earlier goals or structures. Changing these existing systems to fit new regulatory policy may cost more than if no system had been in place.

But existing systems can also facilitate change. Data gathered under a prior regime may—or may only partially—inform reregulatory decision-making. Exploratory or review commissions, possibly established to review collected data, may never have been abolished. Or deregulation may have gutted much of an agency's power without dismantling the agency itself, leaving the agency largely intact and merely awaiting enforcement authority.²⁹

Outside of an agency, prior regimes may have transformed the market into a creature that alters the costs and benefits of reregulation relative to initial regulation. Firms may have been aggregated (directly or by necessity) by regulatory order, presenting reregulators with powerful industry players who have sizable industry-specific investments that cannot easily be disrupted by regulatory change. Or prior regulators could have split up incumbent firms, a difficult process to unwind that again presents reregulators with a more limited set of feasible options. Or prior regulators could have prohibited firms from expanding into particular types of business, affecting the character of the players and the problems that reregulators will later confront. In all these instances, the steps taken by prior regulators and deregulators affect the problems reregulators will face, and the potential options that reregulators can feasibly implement to solve those problems without imposing undue costs.

A binary approach to regulation does not easily capture the existence of or implications from vestigial effects. One could account for some of this effect by assuming that vestigial costs and benefits make it more or less difficult to turn the switch from on to off. But later regulators are not locked into either rolling back or re-imposing former regulation; instead, they can adopt new policies. Doing so may be particularly attractive because of industry changes and vestigial effects accumulating over time. And the new policy to adopt can be usefully informed by opportunities to learn from former policies, as we discuss.

2. Opportunities for Learning

Reregulation arises where there is a relatively complex regulatory timeline. This complexity offers valuable opportunities for learning from experiences with prior rounds of regulation and deregulation, and for gathering information about the impacts from these earlier regulatory regimes. These lessons can be used to inform reregulation, by showing where certain proposed regulatory approaches might prove ineffective based on past experience with a similar approach, or by revealing where regulation is not even necessary based on experience with deregulation.

29. See, e.g., ROBERT BRITT HORWITZ, *THE IRONY OF REGULATORY REFORM: THE DEREGULATION OF AMERICAN TELECOMMUNICATIONS* 264 (1989).

For example, at the point of reregulation, any regulated industry will already have experienced initial regulation, deregulation, and possibly regulatory reform. Each of these prior regimes provides a reregulator with useful information about potential regulatory strategies. The initial experience with regulation can give the reregulator insight into the expected effects that reregulation might have—although some important differences may arise due to changes in the industry since the time of initial regulation. This insight can steer the reregulator towards techniques that were effective and, just as importantly, away from techniques that were ineffective and which may have led to the perceived need for deregulation.³⁰ Likewise, the prior deregulatory regime can show the reregulator where reregulation is particularly needed and where it is not, and may hint at the type of reregulatory intervention that might be necessary.

The prospect of learning from earlier regulatory regimes, while useful for reregulators at the point of reregulation, may also influence the behavior of prospectively oriented regulators at prior points in the regulatory timeline. If regulators are faced with insufficient or uncertain data at the initial point of regulation, one regulatory approach might structure the initial regulation to maximize the potential for future learning opportunities, which then could be used to fine-tune or even completely overhaul the regulation as appropriate. A timeline approach thus helps to illustrate both that regulators can adopt new policies, and that their choices today impact their later ability to regulate.

3. Distinctiveness of Reregulation

We have used reregulation as an emblem of where a timeline approach to regulation captures important relationships that may be obscured by a binary approach to regulation. But neither vestigial effects nor opportunities for learning—the two characteristics of reregulation on which we have focused—are unique to reregulation. Each arises to varying degrees at other stages of the regulatory timeline as well. For instance, the deregulator will confront vestigial effects from the initial regulation, and she can learn from the experience with regulation to pinpoint where regulation's protections have grown sufficiently superfluous to permit deregulation. Even the initial regulator may face industry custom that renders certain regulatory

30. For example, several municipalities experimented with taxi deregulation in the 1970s and 1980s. Following perceived failure of the deregulatory policy, many of these municipalities merely re-implemented the initial regulatory regime. Some, however, learned from deregulation's failures to implement new regulatory policies that also captured some of the observed advantages of deregulation. See *generally* PRICE WATERHOUSE, ANALYSIS OF TAXICAB DEREGULATION AND RE-REGULATION (1993) (describing deregulation and subsequent reregulation of taxicab industry).

approaches more feasible—or necessary—than others.³¹ The hallmarks of reregulation thus differ only in degree, rather than in kind, from the situations that confront regulators at all phases. This means that the timeline approach can be helpful even early in a regulation's evolution.

That said, the influence of vestigial effects and of opportunities for learning tends to grow as one progresses further down the regulatory timeline. Later reregulatory actions are precipitated by historical attempts at regulation and deregulation, which tend to leave more vestigial effects in their wake than were faced by either the regulator or deregulator. In addition, the later position along the regulatory timeline affords the reregulator with more empirical evidence for proposed regulations, based on past regulatory experiences, than was available to the initial regulator or deregulator. But because these differences are of degree, reregulation may be best understood as a special case of the characteristics facing regulators, deregulators, and regulatory reformers.

As suggested by this approach, it can sometimes be difficult to draw sharp lines between what might qualify as regulation versus reregulation versus regulatory reform, or even sometimes deregulation. While the extreme points may be relatively easily classified, some of the middle ground is less clear. Regardless of specific classifications, however, we believe that lessons from reregulation can be carried over usefully into every stage on a regulatory timeline.

III. USES FOR REGULATORY TIMELINES

This Part identifies two uses of regulatory timelines for regulators and for regulatory observers. First, it describes ways that regulators can alter the apparent costs and benefits of current policies by manipulating the temporal scope of a policy analysis. Second, it identifies ways that regulators can utilize the intertemporal dependence of regulatory decisions to alter the landscape of costs and benefits faced by future policymakers.

A. USING TEMPORAL SCOPE

Costs and benefits from regulatory policies are felt over time. To compare policies whose costs and benefits have different points of incidence, regulators properly discount the values to present values.³² Yet regulators rarely explicitly

31. Custom can be a powerful influence on both intra-industry interactions as well as interpersonal interactions, affecting the need for and effectiveness of regulation. *See, e.g.*, ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* (1991) (examining the role of custom in influencing neighborly interactions); Lisa Bernstein, *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 J. LEGAL STUD. 115 (1992) (studying custom in the diamond industry).

32. *See e.g. generally* Cass R. Sunstein & Arden Rowell, *On Discounting Regulatory Benefits: Risk, Money, and Intergenerational Equity*, 74 U. CHI. L. REV. 171 (2007); *see also* Arden Rowell, *The Cost*

address the reasons for their selection of one time horizon over another, and do not consistently use the same time horizon for all policies.³³ For example, selected periods for determining the Yucca Mountain nuclear waste disposal project's costs and benefits varied from 10,000 to 1 million years, while relevant temporal scopes for the Paperwork Reduction Act and for measuring the social cost of carbon are 3 and 300 years, respectively.³⁴

Choosing a temporal end-point for an analysis implicitly treats all impacts after that point as if they have a value of zero.³⁵ The choice of temporal scope can thus sometimes determine which policies look desirable, and which do not. To see this point, consider three competing policies—A, B, and C—whose discounted benefits and costs are the following:

Table 2. Example of How Strategic Shifting of Temporal Scope Affects the Substance of Policy Costs and Benefits

Time Period	Policy A		Policy B		Policy C	
	Costs	Benefits	Costs	Benefits	Costs	Benefits
1	1	3	3	1	1	2
2	4	0	2	3	2	2
3	7	0	1	5	3	3
Total	12	3	6	9	6	7

With these intertemporal distributions of costs and benefits, the selection of time scope will determine which of these three policies appears to be cost-justified—and thus, in many cases, which policy is ultimately selected by regulators.

Note that the “totals” shown are the total impacts over the entire time period. If all time periods 1, 2, and 3 are incorporated into the analysis, Policy A would fail a cost-benefit test, because it results in more costs than benefits. Policies B and C would both pass, because they result in more benefits than cost for the selected time scale. Furthermore, over the same three-period

of Time: Haphazard Discounting and the Undervaluation of Regulatory Benefits, 85 NOTRE DAME L. REV. 1505, 1515–17 (2010) (describing how failing to discount undermines intertemporal comparisons).

33. See Rowell, *supra* note 5, at 1230–38.

34. Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards, 79 Fed. Reg. 23,413, 23,622 (Apr. 28, 2014) (to be codified at 40 C.F.R. pts. 79, 80, 85, 86, 600, 1036, 1037, 1039, 1042, 1048, 1054, 1065, 1066); ENVTL. PROT. AGENCY ET AL., TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS: UNDER EXECUTIVE ORDER 12866, at 25 (2010), <https://www3.epa.gov/otaq/climate/regulations/scc-tds.pdf>. See generally Rowell, *supra* note 5 (describing the time scopes used in various cost-benefit analyses).

35. See Rowell, *supra* note 5, at 1232 (“When a period of time is omitted from a cost-benefit analysis, it is like valuing all costs and benefits after that period at zero dollars. The selection of the relevant ‘end point’ for an analysis thus affects the monetization of costs and benefits,” while conceding that “[t]he selection of the end point will not always matter to the final analysis, especially where many of the benefits are in the far-distant future.”).

scope, Policy B is preferable to Policy C on cost-efficiency grounds: it costs the same amount (6), but yields significantly more benefits (9 instead of 7).

Now consider what happens to the comparative desirability of the policies with shorter time scopes. If the temporal endpoint is set at time period 2, Policy A still fails a cost-benefit test (5 cost is greater than 3 benefit). But so does Policy B—the most desirable policy under a three-period scope! With this time scope, only Policy C would appear to yield greater benefits than costs (as it yields 4 benefits versus 3 costs).

Finally, consider a temporal endpoint at time period 1. With this short scope, Policy A actually appears to be cost-benefit justified (3 versus 1), while *neither* Policy B *nor* Policy C passes a cost-benefit test (1 versus 3 and 1 versus 2). Strikingly, this is true despite the fact that, over all three time periods, policies B and C are the only cost-justified policies.

This example illustrates that the choice of endpoint may be determinative of which policies pass a cost-benefit test, as well as which policy appears most cost-effective. In general, having to choose an endpoint for the temporal scope means that adopted policies will be biased towards those where discounted costs are relatively backloaded and discounted benefits are relatively frontloaded.³⁶ Regulators who are aware of the impact of scope selection could intentionally set the endpoint to justify adopting a preferred policy, even if that policy is not cost-justified or cost-efficient over the long term. Thus regulators can use temporal scope deliberately to change the apparent impacts of a proposed policy. Importantly, however, temporal scope impacts analyses even when it is not selected either reflectively or strategically: for practical and prudential reasons, regulators must typically choose *some* endpoint,³⁷ and any selected endpoint will tend to shift the suite of policies that appear to be cost-justified.

B. USING INTERTEMPORAL DEPENDENCE

The ability to determine the temporal scope over which discounted costs and benefits are analyzed is not the only way that regulators can influence—unintentionally or strategically—future regulatory policy choice. As we have

36. The impact of discounting is such that regulatory impacts in the distant future—whether those impacts are costs or benefits—look relatively small in today's dollars. *See, e.g.,* Rowell, *supra* note 32, at 1510–17 (discussing the regulatory practice of discounting future costs and benefits); David Weisbach & Cass R. Sunstein, *Climate Change and Discounting the Future: A Guide for the Perplexed*, 27 YALE L. & POL'Y REV. 433 (2009). *See generally* Posner, *supra* note 15 (arguing that the impact of discounting on future impacts is so great that agencies should simply ignore distant-future generations). Selection of endpoints is not the only area where impartial regulatory decision-making biases results over time. *See* Melissa F. Wasserman, *Deference Asymmetries: Distortions in the Evolution of Regulatory Law*, 93 TEX. L. REV. 625, 669–79 (2015) (finding that asymmetric incentives to appeal agency decisions and deferential review of those appeals will systematically bias regulatory policy in favor of regulated players).

37. For an argument that agencies should at least perform temporal breakeven analysis in scoping their analyses, *see* Rowell, *supra* note 5, at 1238–39.

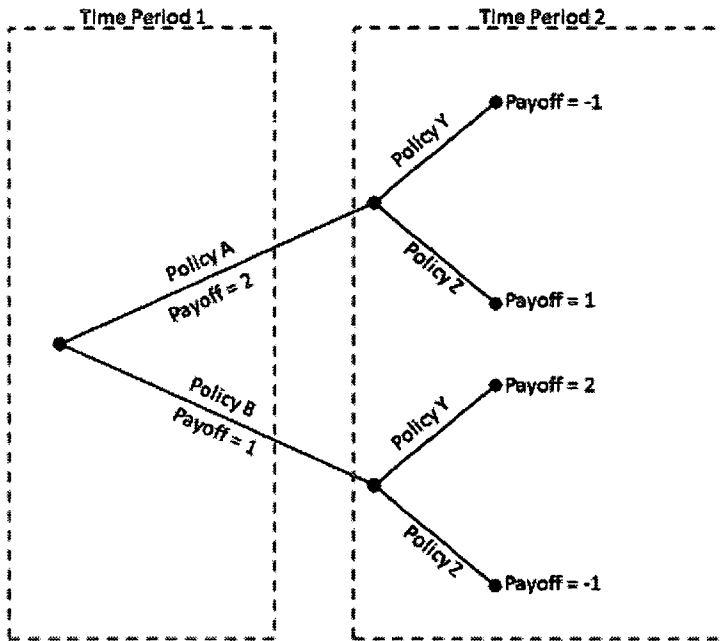
argued, decisions along a regulatory timeline can affect the costs and benefits of other decisions on that timeline. One implication is that the connection can be used strategically to impact the relative appeal, and even availability, of future regulatory decision sets. By imposing vestigial effects on future policy changes, actions taken by the initial regulator can make later sets—for example, at the deregulation, regulatory reform, or reregulation stages—comparatively more or less likely to be implemented. This may be because there is less organized pressure for regulatory change, as when a regulator fragments industry players into smaller heterogeneous entities that face coordination difficulties.³⁸ But it also may be because these later actions are now more costly to undertake and therefore are less likely to provide net benefits.³⁹

For example, suppose an agency must choose between Policies A and B in period 1 and Policies Y and Z in later period 2. Taken individually, Policies A and Y each have expected net benefits of 2 in their relevant periods, while Policies B and Z each have net benefits of 1. If Policy A is chosen in period 1, however, it imposes costs of 3 on Policy Y in period 2, while Policy B imposes costs of 3 on Policy Z. In this situation, the choice in period 1 between Policy A versus B—both cost-justified and thus available under traditional cost-benefit review—constrains future regulators by completely determining the policy that will be adopted in period 2 (Z and Y, respectively). The situation is depicted in Figure 2 below. Similarly, one can visualize a situation where Policy A imposes benefits of 3 on Policy Z in period 2, greatly increasing the chance that Z will be chosen over Y at the appropriate time and conceivably expanding regulators' options in future periods.

38. See, e.g., Michael E. Levine, Essay, *Why Weren't the Airlines Reregulated?*, 23 YALE J. ON REG. 269, 280–83 (2006) (arguing that induced heterogeneity deterred regulatory change in the airline industry).

39. Not only will new policies that provide relatively fewer benefits (or even impose net costs) be less politically attractive than a policy producing more welfare on balance, but also the Office of Information and Regulatory Affairs ("OIRA") requires agencies to perform a cost-benefit analysis before instituting new regulatory policies, with the goal of instituting regulatory change that maximizes total welfare.

Figure 2. Impact of Intertemporal Dependence on Policy Payoffs



Now consider the manner in which these costs and benefits can be introduced. Vestigial effects can impose costs on regulatory change by directly increasing the cost of undertaking new policies. For instance, a deregulatory policy that completely dismantles the prior regulatory agency directly increases the cost of reregulation, because the regulatory agency must be set up again, authority must be (re)allocated, new data must be collected, etc. More commonly, however, vestigial effects introduce costs indirectly, such as through regulators' perceived need to compensate incumbent industry actors for their reliance interests. Regulatory change disrupts this reliance, leading most changes to apply only prospectively or to compensate incumbents for their disrupted expectations (or both).⁴⁰

40. Compensation is generally provided to protect incumbents' reliance interests. For example, energy regulators typically allow power producers to recoup the cost of their investments, even during deregulation. These costs are known in the industry as "stranded costs." Cf. Peter Molk, *The Ownership of Health Insurers*, 2016 U. ILL. L. REV. (forthcoming) (applying this approach to minimize costs of future regulatory change); Peter Molk, *The Puzzling Lack of Cooperatives*, 88 TUL. L. REV. 899, 951-52 (2014) (discussing the differential vestigial impacts from different subsidy approaches). Within the last 25 years, Louis Kaplow and others have argued that in many cases, optimal regulatory policy would not compensate incumbents for their reliance and should impose requirements retroactively. See generally Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509 (1986). Failure to compensate or to apply

The cost of this compensation, or the decreased effectiveness from applying policy changes only prospectively, is then properly factored into the cost-benefit analysis of regulatory change. Both these costs and the direct costs discussed above can be controlled to some degree. A legislator might decide whether to completely dismantle an agency as part of deregulatory change, for example, which would raise the costs of reregulating. Or a regulator might decide to require industry players to meet a minimum production or asset threshold to do business,⁴¹ which may raise the costs of deregulating by inflating the compensation that would be required and by producing a comparatively small number of industry players who can easily mobilize to resist regulatory change.

Regulatory policies need not just impose costs on later parties seeking regulatory change. Regulators can also facilitate future regulatory change by laying the groundwork for it upfront. Or in other words, the impact of vestigial effects can be used either to bind or to strengthen the hands of future regulators. For instance, a regulator might, as part of new regulatory policy, institute new requirements on incumbent actors that make them more competitive, making future deregulation easier.⁴²

changes only prospectively, however, makes it difficult to effect regulatory change where the public or legislators do not vigorously clamor for it, because a failure to compensate is remarkably effective at mobilizing incumbent industry players against change. Compensation may also be appropriate when industry players cannot transfer the risk of regulatory change to private insurance companies, as is often the case. *See, e.g.*, KENNETH S. ABRAHAM & DANIEL SCHWARCZ, *INSURANCE LAW AND REGULATION: CASES AND MATERIALS* 169 (6th ed. 2015) (providing an example of homeowners' insurance policy exclusions for costs of legal change); Kaplow, *supra*, at 536–50. And when incumbent industry players cannot accurately predict regulatory change—perhaps because regulators are in turn trying to accommodate industry players' predictions—the general case against compensation weakens. *See generally* Matthew D. Adler, *Legal Transitions: Some Welfarist Remarks*, 13 J. CONTEMP. LEGAL ISSUES 5 (2003).

41. This has been the result for several cities' taxi regulation, for example, where prospective market participants face substantial buy-in requirements. In New York City, the cost of entering the taxi business exceeds \$1 million. Chris Isidore, *New York City's Yellow Cab Crisis*, CNN MONEY (July 22, 2015, 10:58 AM), <http://money.cnn.com/2015/07/21/news/companies/nyc-yellow-taxi-uber>. For the effects this entry requirement has had on the industry, see Matt Flegenheimer, *\$1 Million Medallions Stifling the Dreams of Cabdrivers*, N.Y. TIMES (Nov. 14, 2013), <http://www.nytimes.com/2013/11/15/nyregion/1-million-medallions-stifling-the-dreams-of-cabdrivers.html>. High taxi license costs are not unique to New York City. *See, e.g.*, S.F., CAL. TRANSPORTATION CODE § 11116(e) (2015) (fixing San Francisco medallions at \$250,000); Thomas Farragher & Jonathan Saltzman, *Amid Criminal Probe, Taxi Owner Looks to Sell: Would Transfer 200 of Fleet's Medallions; Police Commissioner Opposed*, BOS. GLOBE (Sept. 16, 2013), <https://www.bostonglobe.com/metro/2013/09/15/amid-probe-taxi-owner-edward-tutunjian-looks-sell/2mJZ6BtCuLhTElWyQbcYBM/story.html> (referring to \$600,000 medallions in Boston). Likewise, high entry costs that constrain future regulation are not unique to the United States. Emma Bi & Sheridan Prasso, *Investors Turn Hong Kong's Red Taxis into New Bubble Market*, BLOOMBERG BUS. (Aug. 6, 2013, 1:26 AM), <http://www.bloomberg.com/news/2013-08-05/investors-turn-hong-kong-red-taxis-into-latest-bubble-market.html> (reporting a recent license sale of \$987,600 in Hong Kong).

42. This is essentially what California electricity reregulators have done, entering into tens of billions of long-term power supply contracts that encouraged construction of new generators. *See* Paul L. Joskow, *California's Electricity Crisis*, 17 OXFORD REV. ECON. POL'Y 365, 386–87 (2001); Frank

What practical implications for regulatory policy are created by regulators' ability to impose benefits or costs on subsequent regulators? There are at least two stories to tell: one where regulators take advantage of this control to facilitate socially desirable policy, and one where regulators abuse this control to entrench their policy of choice.

In the happy version of the story, a regulator might wisely choose to bind the hands of future regulators by implementing a policy with positive expected benefits that would otherwise face a high likelihood of reversal before those benefits can be realized. Such might be the case, for example, with a policy that imposes costs today but which will yield significant benefits in the future. These policies tend to be politically unpopular and face relatively high chances of being unwound, even if they are the welfare-maximizing policy, because of the focus that tends to be placed on current costs.⁴³ In these instances, making the chosen regulatory policy stickier by raising the costs of switching to another approach could increase the regulation's effectiveness and increase net social welfare over time.⁴⁴

Imposing costs could also help a regulator manage shortcomings in her own ability by committing to a chosen course of action. Lee Fennell and others have shown how failings of willpower—roughly, one's ability to stick to a predetermined course of action—and legal policy can interact to improve

A. Wolak, Designing a Competitive Wholesale Electricity Market That Benefits Consumers 49 (Oct. 15, 2001) (unpublished manuscript), http://web.stanford.edu/group/fwolak/cgi-bin/sites/default/files/files/Designing%20a%20Competitive%20Wholesale%20Electricity%20Market%20That%20Benefits%20Consumers_Oct%202001_Wolak.pdf. Long-term contracting is an essential first step towards effective deregulation, because it obligates generators to run and leads to competitive spot-price markets. See Wolak, *supra*, at 31–32.

43. See, e.g., CASS R. SUNSTEIN, SIMPLER: THE FUTURE OF GOVERNMENT 56–57 (2013) (discussing how there may be little popular or political will to maintain these types of policies). The focus on short-term costs to the exclusion of long-term benefits is driven by several behavioral phenomena, particularly the disproportionate effect that salient factors (such as costs today) have on decision-making. See Shane Frederick et al., *Time Discounting and Time Preference: A Critical Review*, 40 J. ECON. LITERATURE 351, 360–62 (2002) (summarizing evidence of so-called “hyperbolic discounting,” whereby people place a high premium on immediate impacts, and apply a steeply declining discount rate thereafter). See generally Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1519 (1998) (discussing the effect of the availability heuristic on decision-making).

44. Or at least it would raise society's *expected* social welfare. Because future states of the world are uncertain, and the regulation may be more effective in some states than others, it may be that future developments are such that society winds up in a state where the regulation is ineffective—or even destructive. In that case, the costs that were imposed upon the regulation's adoption have the undesirable consequence that they can keep the regulatory policy from being changed, even when it would improve social welfare to do so. This point argues in favor of keeping regulatory policy as flexible and open to later change as feasible, although it is in tension with political realities that may seek to unwind desirable regulation for ideological reasons if the cost of doing so is low, and it also could result in unstable and unpredictable regulatory policy over time, an outcome some commentators disfavor, and which we discuss below. See *infra* Part IV.C (emphasizing the benefits of stable regulatory policy).

or hinder social welfare.⁴⁵ There is little reason to think that willpower failings will be wholly absent from regulatory decision-making, which after all is built on the actions of individuals and can face pressure from legislators, regulated entities, and the public. By imposing vestigial effects that arise with policy change, regulators can credibly tie their future hands, decreasing the chance that later failings in willpower will lead to undoing desirable policies.

Of course, there is no guarantee that regulators will wield their power to entrench only optimal policies that maximize social well being. Strategic use of vestigial effects could just as easily be used to cement undesirable policies that further the regulator's personal agenda or policies that the regulator mistakenly but honestly believes will maximize society's well being.

Regardless of the desirability or undesirability of intentional manipulation of regulatory vestigial effects, the decision of whether to do so is one that must be made at each stage of regulatory decision-making. Furthermore, it is important to recognize that regulators are *already* making these decisions, whether subconsciously or intentionally. One practical prescription would therefore be for agencies to incorporate explicit discussion of vestigial effects and learning opportunities into their cost-benefit analyses and Regulatory Impact Analyses, and for regulatory observers and oversight to demand such analyses.

IV. PRESCRIPTIONS FOR TIMELINES

The previous Part identified ways that regulators can use timelines to change the apparent costs and benefits of current policies, and to change the landscapes of costs and benefits faced by future regulators. These strategies are potent regulatory tools—tools that can be obscured by the traditional focus on binary models of regulation, which neglect the temporal context of regulatory decision-making. One of the primary goals of this Article is to make these tools transparent to regulatory observers as well as to regulators. Temporal line drawing can be extraordinarily difficult to perform in a principled manner⁴⁶—and of course, regulators may not always be perfectly incentivized to develop highly principled forms of intertemporal analysis. Nevertheless, principled consideration and interrogation of regulatory policies on temporal scope setting and time orientation may help regulators develop (more) ethical, defensible, and appropriate strategies for managing these issues.

None of these functions is possible so long as temporal scope and intertemporal dependence remain obfuscated, either by existing regulatory

45. See generally Lee Anne Fennell, *Willpower Taxes*, 99 GEO. L.J. 1371 (2011) (examining willpower, legal policy, and the particular case of tax policy).

46. For a discussion of the physical and social difficulties created by temporal line-drawing, and a recognition of the problems this creates for regulatory cost-benefit analysis in particular, see generally Rowell, *supra* note 5.

practice or by unilateral emphasis on binary models of regulation. In this Part, then, our primary purpose is to describe how regulators and regulatory observers could explicitly incorporate the timeline approach to analyze the impacts of their policy decisions on the portrayal of policy costs and benefits, and on the landscape of future costs and benefits for future policies. Drawing particularly on option theory, we present a spectrum of possible qualitative and quantitative analytical approaches.

In general, we argue that regulatory decision-making can be conceptualized as holding a valuable “regulatory asset” and a corresponding put option on that asset that enables regulators to “sell” the policy if it ultimately proves undesirable. The put option represents the value of adopting flexible regulation that allows one to switch from one policy to another. Traditional approaches that view regulation as a binary switch to be turned on and off imply either that each policy has the same degree of flexibility, or else that flexibility is unimportant. But as the timeline approach makes clear, some policies can be rolled back or altered more easily than others, as different policies will impose varying degrees of vestigial effects. This flexibility, or cost of changing policy down the road, should be factored into the initial policy choice, because what the future world will look like—and how regulatory policies will interact with it—is inherently variable.

To motivate the importance of accounting for flexibility, we compare such an approach to current regulatory cost-benefit analysis (“CBA”) and attempt to refine lessons for other decision-making procedures as well.⁴⁷ Under common practices in regulatory CBA, regulators are encouraged to choose a policy only when its own expected benefits justify its expected costs.⁴⁸ That said, there is no norm for systematic accounting for the costs and benefits the policy imposes on future action or the value from learning opportunities.

We hope that the prior discussion has suggested why this approach is incomplete. Cost-benefit analyses that fail to account for the impact of current regulatory decisions on the suite of future regulatory decisions may well remain blind to the impact of temporal scope and intertemporal dependence, and may needlessly forgo reflective consideration of likely vestigial effects and opportunities for learning. This can make it difficult, if not impossible, to know the optimal longevity of a policy, and to know how

47. Using CBA to inform regulatory decision-making has been facilitated by OIRA’s executive review process, which increasingly requires agencies to justify their chosen policy by showing that its benefits exceed its costs. See generally Cass R. Sunstein, Commentary, *The Office of Information and Regulatory Affairs: Myths and Realities*, 126 HARV. L. REV. 1838 (2013).

48. For the general requirement that agencies perform a cost-benefit analysis prior to promulgating significant rules, see Exec. Order No. 12,866, 58 F.R. 51735 (1993), *reprinted in* 5 U.S.C. § 601 at 88 (2012); Exec. Order 13,563, 76 F.R. 3821 (2011), *reprinted in* 5 U.S.C. § 601 at 102 (2012). For discussion on the process of cost-benefit analysis, see Rowell, *supra* note 5, at 1218–21.

many resources—or foregone benefits—to invest in maintaining flexibility down the road.

Suppose that regulators, regulatory observers, and regulatory oversight bodies (such as the Office of Information and Regulatory Affairs) were convinced that it would be valuable to place their cost-benefit analyses in temporal context. How might they go about operationalizing such an analysis? We believe that financial option theory can be helpful in teasing apart the ways in which current policy choices may relate to future policy choices. Accordingly, below, we introduce basics of financial option theory and indicate how the flexibility value of regulatory policy can be derived from traditional financial options.

A. INSIGHTS FROM OPTION THEORY

Financial options give the holder the right, but not the requirement, to buy (with a call option) or sell (with a put option) an asset at a specified price before a specified date.⁴⁹ We focus on put options here. Put options' value increases as the spread grows between the underlying asset's value and the specified price at which the asset can be sold. Thus, a put option's value is positively related to three factors: (1) the volatility in the underlying asset's price; (2) the exercise price at which the underlying asset can be sold; and (3) the length of time—or expiration date—over which the option can be exercised.⁵⁰ When an individual holds both the underlying asset and a put option on that asset, she has capped her downside risk of a financial loss at the option's exercise price while remaining positioned to capture any upside in asset appreciation. No matter how poorly the underlying asset performs, the individual can always cut her losses by exercising the put option and getting out at the exercise price. If the asset performs well, she never exercises the option but continues to hold the appreciating underlying asset.

Consider how adopting a regulatory policy is similar to holding a valuable asset plus a put option on that asset.⁵¹ Regulatory policy is not static; indeed,

49. For a detailed discussion of options, see generally JOHN C. HULL, *OPTIONS, FUTURES, AND OTHER DERIVATIVES* (8th ed. 2012).

50. The Nobel Prize in Economics was awarded to Myron Scholes and Robert Merton for the initial formalization of this relationship. See, e.g., Fischer Black & Myron Scholes, *The Pricing of Options and Corporate Liabilities*, 81 J. POL. ECON. 637 (1973) (deriving the relationship); Robert C. Merton, *Theory of Rational Option Pricing*, 4 BELL J. ECON. & MGMT. SCI. 141 (1973) (same). More variability in the underlying asset price increases the likelihood of a large spread emerging between the exercise and asset price. A greater exercise price raises the gross proceeds earned by exercising the option. And a longer exercise period increases the likelihood of a profitable gap between asset and exercise price.

51. Other scholars have applied this real options approach—which differs from financial options only in that it considers “real” underlying assets, such as the decision to open a new production plant, instead of financial options where the underlying asset is a financial security. See, e.g., Michael A. Livermore, *Patience Is an Economic Virtue: Real Options, Natural Resources, and Offshore Oil*, 84 U. COLO. L. REV. 581, 587 (2013) (collecting examples and applying real options

as the earlier examples (and common sense) suggest, regulatory policy can change over time through revisions, rollbacks, and new approaches. In a sense, the existing regulatory policy can always be “sold” later, by altering, scaling back, or augmenting it in ways identified by future learning opportunities. In this way, the regulator effectively holds a put option on the underlying regulatory policy asset. If the regulatory policy (the underlying asset) turns out to be undesirable, the ability to “sell” it and switch to another approach (the put option) becomes attractive.⁵² This ability to alter course caps the downside risk associated with any particular regulatory policy. Conversely, as the regulatory policy becomes more effective, the value of the regulation increases but the value of the option decreases, as change becomes less necessary.

To see this, suppose that regulators identify two alternative policies with different suites of expected costs and benefits. One policy is expected to produce \$500 million in benefits half of the time and \$0 the rest (“variable policy”). The competing policy is expected to produce a guaranteed \$300 million in benefits in all future states of the world (“guaranteed policy”).⁵³ Failing to account for future periods of policymaking might lead the regulator to choose the guaranteed policy over the variable policy, because the variable policy’s expected benefit, \$250 million, is less than the guaranteed policy’s \$300 million expected benefits. Yet such a choice neglects the put option value, or the value of being able to switch policies if the variable policy (after opportunity for learning) appears to be creating \$0 in benefits. As a result, the “obvious” appeal of the guaranteed policy may lead agencies to forgo real societal benefits over a world where the regulator selects the variable policy, keeps it in effect if it proves successful, and switches in those states of the world where the variable policy produces \$0 benefit.

Of course, such a switch will not generally be costless, so it is unlikely that the regulator will net the full \$300 million of benefits from the guaranteed policy upon switching course. Indeed, a motivating force behind our study of

theory to nonrenewable natural resource extraction). *See generally* IAN AYRES, *OPTIONAL LAW: THE STRUCTURE OF LEGAL ENTITLEMENTS* (2005) (applying option theory to a variety of liability rules). In the regulatory sphere, often the real option is modeled as a decision to act or to wait for additional information, rather than, as here, the generalized case of choices among differing policies. *See, e.g., id.*; Lee Anne Fennell, *Revealing Options*, 118 HARV. L. REV. 1399 (2005) (applying financial options theory to property rights); Joseph A. Grundfest & Peter H. Huang, *The Unexpected Value of Litigation: A Real Options Perspective*, 58 STAN. L. REV. 1267 (2006) (applying real options analysis to decision to continue or abandon litigation). In comprehensive work that makes comparisons to financial options, Professor Alex Lee has argued how option theory can improve regulations both when options are granted to regulated entities to choose to avoid particular regulations and when regulators recognize that undesirable regulation can be abandoned. Yoon-Ho Alex Lee, *Essay, An Options Approach to Agency Rulemaking*, 65 ADMIN. L. REV. 881, 886–88, 908–09 (2013) (discussing the case of call options).

52. *Cf. Lee, supra* note 51, at 904–05 (comparing regulatory policy to call options).

53. *See id.* at 903–20 (discussing similar examples).

the term “reregulation” has been to show that such switches are *not* costless, because they impose vestigial effects on subsequent decisions. Yet unless the switch incurs \$200 million in costs, including lost regulatory effectiveness from first trying another policy, initially adopting the variable policy is the choice that most benefits society.⁵⁴ To see why, notice that the expected benefits from the variable policy, properly including the value of the put option, rise to \$400 million minus $0.5q$, where q represents the switching cost. This is because half the time the benefits will be \$500 million, and half the time they will be \$300 million minus q . In this example, the value of the put option, or the ability to switch course, equals the difference between this amount and the expected benefits from adopting exclusively the variable policy, or \$150 million minus $0.5q$.

In the general case, the value of the regulatory put option will have determinants similar to a financial put option. The variance of a policy’s expected outcomes across future world-states—such as from regulated industry’s proclivity for change, or a policy’s disparate effectiveness across different economic conditions—is analogous to volatility in a financial option’s underlying asset price. Flexibility, and hence put options, becomes more valuable when there is a meaningful probability that the regulation will later prove ineffective or undesirable, which depends critically on there being uncertainty.⁵⁵ The “pace” of this variance—whether it occurs early in the regulatory timeline—functions similarly to a financial option’s expiration date. A faster pace, with high variance in outcomes early on, increases the probability that a regulatory option will be “in the money” and raises the option’s value, as do later expiration dates with a financial option. And the difference between a next-best policy’s expected value and the first-best policy’s expected value, net of regulatory change costs, functions for a regulatory option like the difference between the initial asset price and the exercise price of a financial put option.⁵⁶ Higher costs of regulatory change drive a wider wedge between the existing and next-best alternative, making it

54. This assumes risk neutrality on the part of the regulator. It is also possible, however, that regulators are risk-averse, because they personally value job security that could be risked if negative world-states are realized, and/or because principles of intergenerational fairness may militate against undertaking policies with meaningful downside risk.

55. Therefore, less uncertainty about the future or lower variation in the outcome under uncertain future events will reduce the attraction of policies that promote flexibility. See Brian Galle, *In Praise of Ex Ante Regulation*, 68 VAND. L. REV. 1715, 1759 (2015) (applying this argument in favor of “ex ante” regulation because of a popular misconception that overstates the uncertainty of future valuation).

56. For regulatory option purposes, the next-best policy would be the one with the highest expected benefits in those states of the world in which it would be adopted, roughly coinciding with those states where the first-best policy fails. This need not be the same as the policy with the second-most overall expected benefits, if that policy would rarely be exercised (for instance, if that second-most policy performs best in only the same states of the world in which the first-best policy does).

less likely the option will be exercised, just as larger initial differences between exercise price and asset price reduce the value of the option. This relationship is summarized in Table 3 below.

Table 3. Relationship of Regulatory Option Type and Option Price

Financial Put Option	Regulatory Option	Effect of Increase on Option Price
Asset variance	Variance in regulation’s expected value	Increase
Expiration date	“Pace” of variance in regulation’s expected value	Increase
Difference between asset and exercise price	Difference between first- and second-best policy expected values; Cost of changing policy	Decrease
Asset price	Regulation’s expected value	Decrease

B. INCORPORATING FLEXIBILITY INTO DECISION-MAKING

If regulatory option value is an important component of regulatory decision-making, but regulators do not systematically account for it, what should be done? We make four proposals, in increasing order of sophistication and cost. All four methods could be useful both to regulators performing Regulatory Impact Analyses, and to regulatory observers evaluating regulatory analyses.

1. Follow Simple Rules of Thumb

The easiest and simplest strategy that regulators might use to incorporate flexibility value into their decision-making is for them to follow simple rules of thumb that capture the essential attributes of flexible policies and option theory. Although this is a relatively simple approach, it is also an approach that comes with potential misfires, and thus regulators should be particularly cautious about using it in high-stakes contexts.

What heuristics might regulators use to capture the essence of regulatory put option pricing? First, all else equal, and where the purpose of a regulation is to secure the most social welfare (and where additional concerns, such as distributional fairness, do not bar the strategy), regulators might choose the policy with *greater variance in expected outcomes*. This is because future regulatory (and exogenous) change can step in and buttress negative states of the world, raising the overall expected benefits. This rule of thumb may run directly counter to the first instincts of many regulators, whose risk aversion may drive them towards choosing a policy that provides stable, reliable benefits in all future states of the world. Again borrowing from financial theory, such risk-averse regulators are in effect choosing the reputable blue chip stock (a single

policy) with reliable but low expected returns, rather than building a portfolio from two or more uncorrelated stocks (an adopted policy with one or more contingent possibilities depending on future realized states of the world) with both higher expected returns and lower overall risk.

A second rule of thumb would be to adopt *the more flexible policy with lower switching costs*, all else equal. Greater flexibility facilitates changing future regulatory course, which is particularly valuable when existing policies later prove less effective than originally hoped.

Both of these rules of thumb may raise objections because each requires a determination that “all else is equal” among policies, and realistically regulators may rarely know when that is the case. Therefore, we offer a final rule of thumb in the form of a default rule: *avoid regulatory policies with high switching costs*—particularly those with switching costs so high as to render them permanent as a practical matter. This amounts essentially to an anti-irreversibility assumption for regulatory policy.

Employing these rules of thumb would mean that regulators’ decisions would incorporate some of the insights from option analysis. These guidelines could easily be integrated into regulatory decision-making practices with little or no difficulty. Rules of thumb, however, inevitably miss some of the finer nuances that could lead to more tailored decision-making. For the slightly more ambitious regulator, or for policies with larger stakes, we present a second option that is somewhat more difficult to implement but that captures more of the important implications of option pricing and the value of flexibility.

2. Perform Qualitative Ordinal Analysis

Our second recommendation is for regulators to first ordinally rank potential policies along several factors that capture much of the option pricing insights. We recommend that regulators rank policies along the following specific dimensions: overall expected benefit (from high to low); variability of the expected benefits (from high to low); and flexibility, or ease of switching to a competing policy (from most to least). These ordinal rankings capture much of the insight offered by option analysis. After developing these ordinal rankings, regulators would then make tradeoffs across the different lists to arrive at an ultimate decision.

Regulators often already compose ordinal rankings along the overall expected benefit dimension and typically choose the policy that tops that list, or else choose from among the policies that are cost-benefit justified. Yet in many circumstances, that policy will not be optimal.⁵⁷ Regulators will frequently find that the policy topping the expected benefit ranking may

57. Regulators could be assured that the highest expected value policy is also the optimal policy only when that policy promises the most net benefits in every possible future state of the world.

come in much lower along the variability of expected benefits or the flexibility dimensions, and in that case the competing policies deserve close attention before being dismissed. A competing policy with high variance in expected benefits could reasonably be chosen over the policy that ranks highest in expected benefits with low variability in those benefits, if the competing policy could be rolled back in favor of another when it performs poorly. Ranking policies along these dimensions will prove to be a very useful exercise for regulators. It also presents a more realistic scenario than a recommendation based purely on rules of thumb, because decision-making in the real world rarely has “everything else equal” scenarios, but rather presents the type of difficult tradeoffs illustrated in an ordinal ranking.

These first two approaches, qualitative in nature, capture many of the benefits from quantitative option analysis without requiring regulators to undertake rigorous numerical analysis. Their virtue is their ability to improve regulatory decision-making beyond current practices while being easy to implement. Explicitly requiring regulators to think about the value of flexibility, even in this qualitative manner, should lead them to better incorporate this value into their decision-making.⁵⁸ Qualitative approaches do not tell regulators how to make tradeoffs between expected benefits and other factors, however. For those looking for additional guidance on how to trade off quantified benefits like expected values and unquantified ones such as the value of flexibility, we present two additional options.

3. Use Full Decision Trees

Still more of the value of flexibility could be captured if regulators developed complete decision trees. These decision trees would extend the decisions past the present and into the future, capturing the options that regulators have to later alter policy. Backwards induction from distant points on these trees would then yield the appropriate policy to be followed.

Figure 3 illustrates a simplified CBA process, which is broadly representative of modern practices in regulatory decision-making. Regulators concentrate on the immediate decision, assuming it remains in place in the future—implicitly assuming that the selected policy should be modeled as a switch that can be toggled only once. Resultant decision trees have one

58. There is empirical evidence for the effectiveness of this type of approach, particularly if it is combined with disclosure requirements. Section 404 of the Sarbanes–Oxley Act requires managers and auditors to provide a narrative statement assessing the adequacy of the company’s internal controls on financial reporting. Sarbanes–Oxley Act of 2002, Pub. L. No. 107–204, § 404(a)(1), 116 Stat. 745, 789 (codified at 15 U.S.C. § 7262(a)(1) (2012)). Evidence suggests the narratives have led management to adopt more effective internal controls, which could be because the exercises lead them to internalize the value of internal controls as well as enact change so that the resultant narrative statements are more palatable when disclosed. Robert Prentice, *Sarbanes–Oxley: The Evidence Regarding the Impact of SOX 404*, 29 CARDOZO L. REV. 703, 717–20 (2007) (collecting this evidence).

substantive policy node: the choice between the contemplated policy (or policies) and a competing policy (which could be to stay with the status quo). Figure 4 shows a full decision tree of the type we contemplate based on a timeline, which extends policy choices past the present by including the option to switch regulatory policies at later stages. Drawing an extended decision tree allows regulators to capture the flexibility of regulatory policy. By incorporating the ability to change course in those states of the world where an adopted policy proves problematic, the sophisticated regulator arrives at the regulatory policy choice that might be expected to improve overall social welfare.

Figure 3: Simplified CBA Process

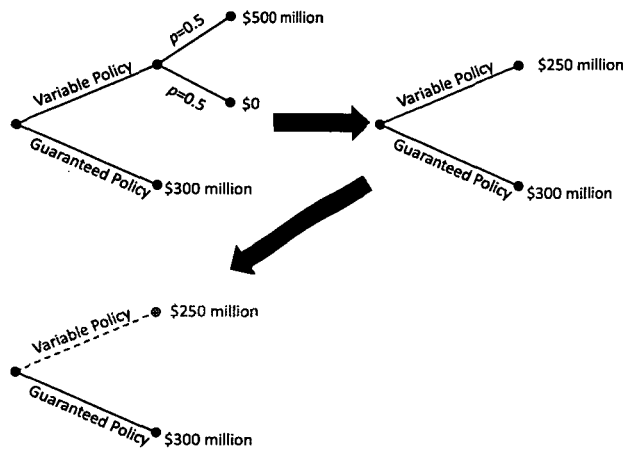
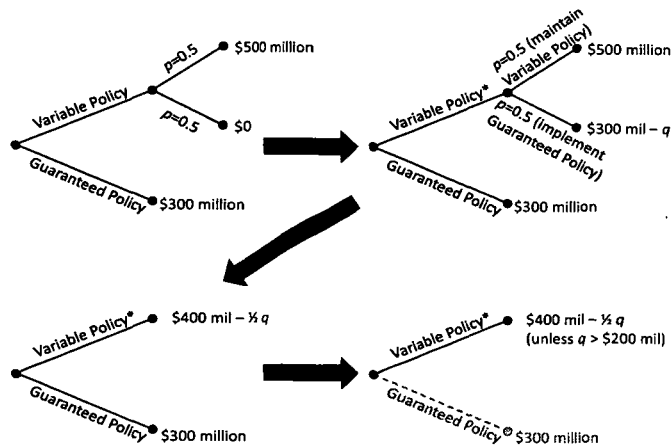


Figure 4: Timeline-Based Decision Tree



As is readily apparent, designing such a decision tree can quickly spiral into a herculean task as the possible states of the world increase at each node and as the number of future nodes grows. The complexity grows even more quickly as regulators consider multiple policy alternatives. A decision tree, then, is a higher-cost analytical option, where the cost increases with multiple policy options and policy longevity. That said, the approach captures a significant portion of the insights of option theory, and the analytical cost may be worthwhile where the policy stakes are relatively higher.

4. Price the Regulatory Option

Finally, and most complicatedly, regulators (or regulatory observers) could develop and use a formal option pricing model to explicitly value a policy's flexibility—a model that, while burdensome, has had a revolutionary effect on the financial industry.⁵⁹ Armed with option prices plus the expected benefits from regulatory policies, regulators would have a better chance of maximizing the joint expected value of the underlying regulation and the value of the regulatory option, rather than maximizing exclusively the regulation's expected value, as they do under existing practices.

Implementing such a model in practice may be easier than it might first appear. Although a formal model must first be developed, analogous models in financial and real option theory provide valuable starting points. Additionally, such a model will require knowing crucial data including the set of future world-states; regulatory policy's effectiveness in each future world-state; alternative regulatory approaches today and in the future; and the payoffs of these alternative policies in future world-states. This list appears rather daunting, but much of these data are already factored into current CBA, so that areas where cost-benefit analysis is already fully integrated into regulatory decision-making might be the best places to introduce an option pricing model. To determine expected benefits of a regulatory policy with CBA, for example, one must have a sense of the probability distribution of future states of the world and the policy's expected payoffs in each.⁶⁰ And to arrive at the policy that maximizes net benefits using traditional CBA, the regulator must compare one policy to another while knowing multiple policies' expected payoffs in each of these states of the world. Once a

59. It bears noting that while the financial option pricing models were initially developed by academics, the potential profits at stake have ensured the continued refinement of options pricing models by private industry. Similar financial motives have spurred the recent development of real options models. See AVINASH K. DIXIT & ROBERT S. PINDYCK, *INVESTMENT UNDER UNCERTAINTY* 6–7 (1994) (discussing real options). Regulatory option pricing, however, must be reliant almost entirely upon academics for its development, absent an intervening government subsidy or bounty program that could encourage private involvement, because of their application to the public sector rather than to private profitmaking opportunities.

60. This is because, for regulation R_j , $E(R_j) = \sum_i [p_i \cdot V(R_{j,i})]$ where p_i is the probability of being in world-state i and $V(R_{j,i})$ is the value of regulation j in world-state i .

regulator adds an estimate of the cost to switch from one policy to another at various world-states to this information, she has all the information necessary for a first-pass option price.⁶¹

That said, we do not wish to overstate the ease of implementing an option pricing approach. While simplifying assumptions about the magnitude and distribution of expected benefits would ease implementing such a model, they would also create limits on generalizability. And given the difficulties that regulators have with even agreeing upon a discount rate⁶²—essential for an option pricing approach—comprehensive modeling would not be appropriate for the faint of heart. Yet even knowing rough bounds on the value of flexibility would be a useful piece of information for regulators, who now must rely on gut instinct if they are even aware of flexibility's importance.

C. FORGOING CERTAINTY?

This Part has focused on the importance and feasibility of explicitly incorporating a valuation of flexibility into regulatory decision-making. Some readers might object that regulators who focus on flexibility in turn overlook the value that comes from choosing sticky and predictable policies. Certainty and predictability facilitate long-term investments, but both industry players and the public may reduce long-term investments because of uncertainty if they perceive that regulators will concentrate on flexible, and thus malleable, regulations. Thus regulators may struggle to maximize both flexibility and certainty simultaneously.

We have two intuitions in response to this concern. The first is that the costs of lost certainty could be folded into the policy choices that regulators make. The prospect of lost long-term investment, or of preserving long-term investment at a cost of compensating existing players with grandfathering, can be incorporated into existing decision-making practices. In this sense, forgoing certainty can be thought of as a cost to "purchasing" the flexible option to switch. For that reason, we should expect the value of the regulatory put option to be lower where there are substantial reasons to want to promote predictability and expectation-based investment. It is even possible that, where future world-states have low variability, or where the value of certainty is particularly high, that the net value of some regulatory put options could be negative. Such information would be very valuable to regulators and to regulatory observers and should be used as a reason to select guaranteed policies. In some cases, it might even provide justification to "bind the hands" of future regulators to prevent them from disrupting the predictability in the system.

61. See *supra* Table 1.

62. See Rowell, *supra* note 32, at 1512–14 (describing the importance of and disagreement over selecting a discount rate).

Our second response would rely on private market substitutes to provide certainty to industry players—in essence, an insurance against policy change. Such a product would allow regulators to focus on the flexibility component to decision-making without worrying about the certainty side. It would also ensure that private industry players do not over-rely on existing regulatory policy, which is a negative side effect from a policy of certainty and grandfathering. Louis Kaplow's work on legal transitions shows the value that can result from this approach, and by extension the private incentives that would exist to develop such a market.⁶³ While such a private market currently fails to exist, there is no reason to think it could never prove viable; its current absence may simply be explained by existing regulatory practices, under which retroactive compensation and grandfathering provide little need for additional products.

D. SUMMARY

Viewing regulatory decision-making as toggling a binary switch rather than as occurring along an interconnected timeline tends to decontextualize regulatory decisions, and can thus obscure important ways in which decisions later on a timeline are different from those earlier on the same timeline, as well as ways in which earlier decisions can change the cost-benefit landscape of subsequent decisions. This can lead regulators to implement suboptimal practices that cannot only fail to maximize social welfare, but can even impose more costs than benefits over time. Recharacterizing regulatory decision-making as choosing a regulatory policy *plus* holding an option can help reduce these risks. And as we have shown in this Part, implementing such a recharacterization within existing regulatory decision-making practices can be done in a variety of ways, ranging from easily implementable to more challenging but more comprehensive. All offer at least some benefit over continued ignorance of intertemporal intrapolicy impacts.

V. CONCLUSION

This Article has explored the implications of conceiving of regulation as unfolding along a timeline rather than as a toggling a binary switch. The distinction between the timeline and binary approaches is particularly illuminating when comparing examples of reregulation to instances of initial regulation. Such comparisons reveal the vestigial effects and opportunities for learning that arise from the interconnectedness of past, present, and future regulatory policies. Accounting for this interconnectedness at every stage of regulation reveals the usefulness of incorporating flexibility value into existing decision-making procedures.⁶⁴

63. See *supra* note 40.

64. Examples of existing or pending regulatory intervention that could benefit from incorporating timeline approach insights are not hard to find. For example, regulators have

Although policymakers could rely on agencies' voluntary adoption of the timeline approach, a systematic legal requirement that agencies consider the ramifications from interconnected regulatory policy might not be out of order. Where might such a requirement be situated institutionally? Scholarly analysis of agency oversight has traditionally focused on judicial review, but for several reasons the judiciary is comparatively poorly situated for ensuring agencies adopt insights from the timeline approach.⁶⁵ Executive review may

expressed a desire for private insurers to assume homeowners' risk of loss from floods, which currently is underwritten by the federal government through that National Flood Insurance Program ("NFIP"). U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-127, FLOOD INSURANCE: STRATEGIES FOR INCREASING PRIVATE SECTOR INVOLVEMENT 1-2 (2014). One method of accomplishing this would be for state regulators to mandate that homeowner insurers doing business in the state cover these water risks, and to discontinue government-backed policies. See, e.g., DELOITTE, THE POTENTIAL FOR FLOOD INSURANCE PRIVATIZATION IN THE U.S.: COULD CARRIERS KEEP THEIR HEADS ABOVE WATER 12-13 (2014), <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-the-potential-for-flood-insurance-privatization-in-the-us-040114.pdf>; Peter Molk, *The Government's Role in Climate Change Insurance*, 43 B.C. ENVTL. AFF. L. REV. (forthcoming). Such an approach, however, suffers from a lack of flexibility should a private insurance regime ultimately fail. Instead, an approach that capitalizes on the value of flexibility and the opportunity to learn would facilitate private competition alongside government-backed NFIP policies. If private insurance does not pan out as hoped, it is relatively simple for the NFIP to reassume the entire burden, while if private insurance performs well, the NFIP can be gradually withdrawn. And in a market with little private underwriting, the learning opportunities from whether and how private insurers participate are particularly valuable for designing future regulation. Another prominent example is the ongoing debate over how to regulate smartphone rideshare services like Uber. Some regulators have banned these services in an attempt to preserve the large firm-specific investments of existing taxi providers. See Brian X. Chen, *A Feisty Start-Up Is Met with Regulatory Snarl*, N.Y. TIMES: TECH. (Dec. 2, 2012), <http://www.nytimes.com/2012/12/03/technology/app-maker-uber-hits-regulatory-snarl.html> (introducing new regulations in response to Uber); *Medallion Transfers: Medallion Price Disclaimer*, NYC TAXI & LIMOUSINE COMMISSION, http://www.nyc.gov/html/tlc/html/about/medallion_transfers.shtml (last visited Mar. 2, 2016) (providing information on high New York City medallion transfer prices, a component of startup expenses for existing drivers); Jamal Thalji, *Hillsborough Negotiating with Lyft, but Uber Not Talking*, TAMPA BAY TIMES (Aug. 1, 2014, 7:15 PM), <http://www.tampabay.com/news/business/hillsborough-negotiating-with-lyft-but-uber-not-talking/2191155> (discussing civil and criminal prosecution of rideshare companies in Tampa). While maintaining the status quo may promote flexibility, it should be weighed as only one factor among several when assessing the desirability of various choices. Services like Uber may present a situation where choosing a policy lower in flexibility is the optimal course because of the significant benefits that arise from compromising on flexibility by at least partial deregulation and disruption. See generally PRICE WATERHOUSE, *supra* note 30 (describing the benefits and costs of past taxi deregulation experiences). A better regulatory response, therefore, might embrace services like Uber, require mandatory minimum third party liability coverage, take steps to address increased congestion costs from additional drivers, and continue to protect non-Uber customers from price or quality opportunism.

65. See Jennifer Nou, *Agency Self-Insulation Under Presidential Review*, 126 HARV. L. REV. 1755, 1757 (2013) (commenting on the scholarly preoccupation with judicial review in the context of strategic agency action). Institutionally, and for both prudential and separation of powers reasons, courts are generally reluctant to require more procedure from agencies than has been required by Congress. *Vt. Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 524 (1978). Thus, courts are unlikely to play much if any role in requiring agencies to apply a timeline approach to their decision-making, at least insofar as doing so looks like requiring

be a more natural fit, especially as it is currently centralized within Office of Information and Regulatory Affairs (“OIRA”).⁶⁶ Over the past couple of decades, OIRA has moved towards increasingly systematic review of agency assumptions and the expected impacts of policies, focusing particularly on their costs and benefits.⁶⁷ OIRA thus already plays a “gatekeeper” role in agencies’ significant prospective cost–benefit analyses for proposed rules, and an increasing role in the requirement that agencies perform retrospective analyses.⁶⁸ It could use the same mechanisms for review and enforcement to extend requirements for these analyses to include explicit accounting of the intertemporal intrapolicy impacts of the proposed policy, using any of the possible methods for such accounting discussed above.⁶⁹ Such a requirement could help OIRA and agencies in interrogating the assumptions underlying proposed rules. Thus the executive review process could be a very effective way of ensuring agencies account for important insights from the timeline approach.

Regardless of the specific mechanism through which the timeline approach is incorporated into regulatory decision-making, however, modeling decisions as occurring along a timeline instead of (only) toggling a binary switch promises the possibility of improving regulatory policies and enhancing social welfare. Recognizing the vestigial effects of regulatory policy and the opportunities for learning, and creating explicit resulting models for understanding the value of regulatory flexibility, can lead to better policy decisions today and in the future.

additional procedure, over and above what is required in individual statutes or by the Administrative Procedure Act. Furthermore, under the current—albeit controversial—*Seminole Rock/Auer* doctrine, agencies are given a remarkably wide discretion in reinterpreting their own regulations.

66. See Nou, *supra* note 65, at 1757–59 (exploring the role of executive review); Sunstein, *supra* note 47, at 1844–63 (reviewing the internal operation of the Office of Information and Regulatory Affairs).

67. Sunstein, *supra* note 47, at 1839.

68. Retrospective review—which could benefit particularly from analysis of vestigial effects and opportunities for learning—has been required under Executive Order since 2011. See Exec. Order 13,563, *supra* note 48 (requiring systematic implementation of retrospective review). See generally Cary Coglianese, *Moving Forward with Regulatory Lookback*, 30 YALE J. ON REG. ONLINE 57 (2013) (summarizing past administrations’ periodic retrospective review policies, and calling for increased institutionalization and systemization of current retrospective review processes).

69. A regulatory option value in particular could fruitfully be incorporated into agencies’ systematic analyses of regulations’ costs and benefits.

